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The European Knowledge Based Bio-Economy

- KBBE -

Research Directorate-General
European Commission
DG RTD-E Biotechnology, Agriculture and Food

The Knowledge-Base

Life Sciences and Biotechnology in convergence with other technologies..,

…provides the knowledge-base for the sustainable management, production and use of biological resources…

… provides new, safe, affordable and eco-efficient products …

… supports competitiveness and sustainability of major industries

Example:

- Use of enzymes in industrial and household processes (washing powder), have strongly reduced energy and water consumption

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The Bio-Economy

The term "bio-economy" includes all industries and economic sectors that produce, manage and otherwise exploit biological resources (e.g. agriculture, food, forestry, fisheries and other bio-based industries);

The European bio-economy has an approximate market size of over €1.5 trillion, employing more than 22 million people (= 5% of EU population)

Sector	Annual turn-over (billion €)	Employment (million)	Data source
Food	800	4.1	CIAA
Agriculture	210	15	COPA-COGECA
Paper/Pulp	400	0.3 direct (4 indirect)	CEPI
Forestry/Wood ind.	150	2.7	CEI-BOIS
Industrial Biotech.	50 (est) *		McKinsey *
Total	1610	22.1	

* estimated to be around €100-160 million by 2010

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Knowledge Based Bio-Economy
Opportunities and challenges
beyond growth and employmen

- Secure a sustainable agriculture and fisheries production for a rising world population, on limited arable land and facing impacts of climate change;
- Secure the demand for renewable bio-resources for eco-efficient products and biofuels;
- Meet consumer demands for high quality foods which promote health and wellbeing plus increase choice and convenience;

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Knowledge Based Bio-Economy
Policy drivers

Directly relevant:

Research & Innovation; Common Agricultural Policy, Common Fisheries Policy, Forestry Strategy, agriculture and trade issues, food safety regulations, Community Animal Health Policy, Environment and Health Strategy, Competitiveness, Consumer Policy, Regional Policy;

Others:

Energy (biomass), transport, environment and biodiversity (climate change, waste, biodiversity,) education and training, employment, internal market (data protection, IPR), European neighbourhood and development policies.

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Knowledge Based Bio-Economy
European assets

A European bio-economy cannot compete on a global level by delivering only basic agricultural commodities, but needs to build on European strengths:

- excellent science, technology and industry base to deliver innovations;
- biotech companies have developed genetically engineered crops used world-wide;
- leader in innovative food technologies and products;
- leader in innovative animal breeding technologies;
- strong chemical and manufacturing industry base.

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Knowledge Based Bio-Economy
How to make it happen

- Policy-makers, governments, industry, public and private research bodies, civil society to recognise the potential of life science and biotechnology and discuss a framework for growth;
- Establish a regulatory, institutional and societal environment supportive of a bio-economy;
- Demonstrate clear benefits for the consumer;
- Incentives to exploit its benefits in terms of competitiveness, environmental compatibility and potential for rural development;
- Participants in the chain – farmers, industry, regulators and consumers – need to get together to actually make the bio-economy work.
- FP7 Food, Agriculture and Biotechnology research programme

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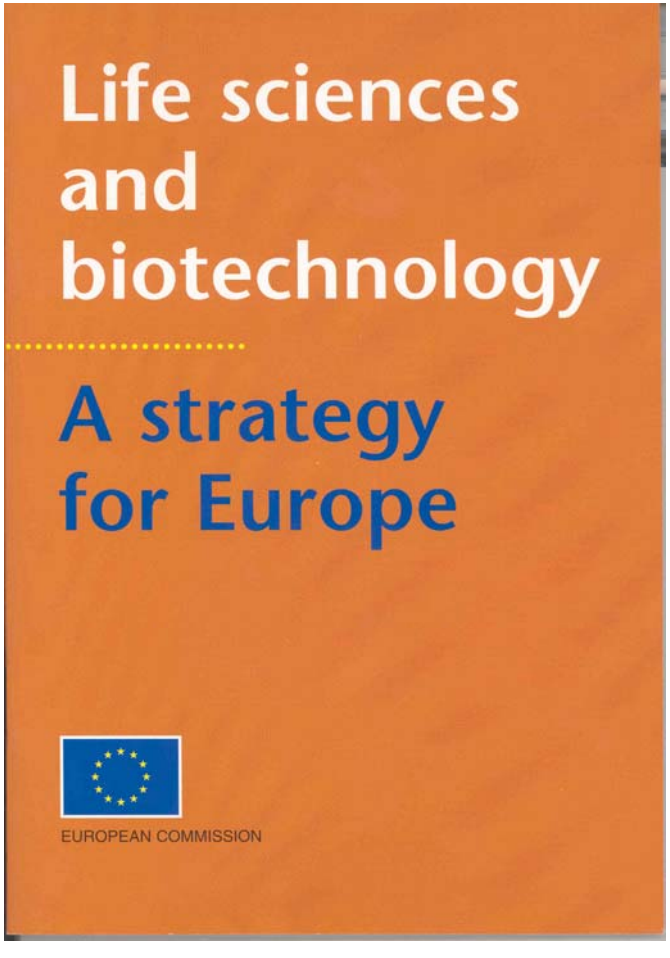
Life Sciences and Biotechnology
A Strategy for Europe
COM(2002)27 - January 2002



Biotechnology has the potential to improve non-food uses of crops as sources of industrial feedstocks or new materials such as biodegradable plastics.

Biomass may contribute to alternative energy sources …such as biodiesel and bioethanol.

Biotech may lead to the development of cleaner industrial products and processes using enzymes (biocatalysis)

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EU Framework Programme 7
2007 - 2013

Cooperation **– Collaborative research**

Ideas **– Frontier Research**

People **– Human Potential**

Capacities **– Research Capacity**

+

JRC (non-nuclear)

JRC (nuclear)

Euratom

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Cooperation – Collaborative research

9 Thematic Priorities

1. Health
2. Food, agriculture and biotechnology
3. Information and communication technologies
4. Nanosciences, nanotechnologies, materials and new production technologies
5. Energy
6. Environment (including climate change)
7. Transport (including aeronautics)
8. Socio-economic sciences and the humanities
9. Security and space

2. Food, Agriculture and Biotechnology

Sustainable production and management of biological resources from land, forest, and aquatic environments

“Fork to farm”: Food, health and well being

Life sciences and biotechnology for sustainable non-food products and processes

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Food, agriculture and biotechnology research: Objectives

- « Strengthen the knowledge base, deliver the innovations and provide policy support for building and developing a European Knowledge Based Bio-Economy (KBBE) »
- Respond to social and economic challenges:
  - Sustainable agriculture/fishery and climate change
  - Clean biomaterials from renewable bio-resources
  - High quality food and sustainable food production
  - Food-related disorders (cardiovascular, obesity …)
  - Infectious animal diseases and zoonoses

- Involve all stakeholders (incl. industry) in research
- Support CAP and CFP
- Respond quickly to emerging research needs

THE EUROPEAN KNOWLEDGE-BASED BIOECONOMY
INDUSTRIAL BIOTECHNOLOGY

Textiles | Pulp/paper | Plastics | Drugs | Food | Fuels | Bioremediation

BIOBASED MATERIALS FOR HEALTH, INDUSTRY & ENERGY

STABILITY
BIODEGRADABILITY
FUNCTIONALITY (Chirality)

IMPROVED PURIFICATION
SEPARATION TECHNOLOGIES
HYBRID REACTORS
SCALE UP TECHNOLOGIES
CONTINUOUS/SOLID STATE FERMENTATION
ENGINEERED MICROBES
SUPERIOR ENZYMES

CROPS AND WASTE
DELIVERY SYSTEMS
SOURCES OF SUGAR

UTILISATION

PROCESSING

FEEDSTOCK PRODUCTION

INCREASE CONSUMER AWARENESS

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Knowledge Based Bio-Economy
Where are we?

FP6 (2002-2006)

- Creation of 7 Technology Platforms relevant to the KBBE
- 10 relevant ERA-NETs
- KBBE stakeholder conference (Sep 2005)

FP7 (2007-2013)

- Theme « Food, Agriculture and Biotechnology » (FAB) to support the KBBE
- Greater involvement of SCAR in FAB development
- Launch of KBBE-Net (March 2006)
- Technology Platform co-ordination (March 2006)
- ERA-NET collaboration (June 2006)
- Launch of FAB Advisory Group (June 2006)
- Publication of first FAB Work Programme (Autumn 2006?)
- Development of interface with CSOs (July – December 2006)
- First Call FAB Programme – (Winter 2006/Spring 2007?)
- http://ec.europa.eu/research/biosociety/kbbe/basics_en.htm

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US participation in FP

FP6-Food Quality and Safety (2002 – 2006)

11/178 projects with US participation (14 research teams):

iotechnology:

- Science 4 Bioreg (SSA): Biosafety and Agricultural Biotechnology regulations. *Oregon State University*
- Meta-Phor (STREP): Metabolomic Technology Applications for Plants, Health and Outreach. *Harvest Plus.*

ood Quality:

- E-Trust (SSA): quality assurance in emerging markets. *University of Florida.*
- Develonutri (STREP): Optimise Nutritional Value of Crops and Crop-Base Foods. *National Institute Of Science and Technology.*
- Isafruit (IP): Increasing Fruit consumption through a trans-disciplinary approach. *University of California.*
- Q-Porkchains (IP): Improving the quality of pork and pork products fo the consumer. *Kansas State University.*

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US participation in FP

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11/178 projects with US participation (14 research teams):

- *Food Safety:*

  - EU-US-Safe-Food (SSA): Strategic Transatlantic Approach to Food Safety. *USDA*
  - Myco-Globe (SSA): Mycotoxin and Toxigenic Fungi Research for Food Safety. *(i) USDA, (ii) Kansas State University.*
  - Phime (IP): Public health, long-term, low-level mixed element exposure. *University of Rochester School of Medicine and Dentistry.*
  - ProSafeBeef (IP): safety of beef and beef products for the consumer. *(i) University of Florida, (ii) Colorado State University, (iii) USDA.*
  - PEN (CA): Pathogenic Escherichia coli Network. *Eastern Regional Research Center (USDA-ARS-ERRC).*

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International Cooperation in FP7 (2007 – 2013
- IMPLEMENTATIO

International cooperation in "*Collaborative Research*"

1. **Participation in all research activities** carried out in the 9 thematic areas (minimum 3 European countries, plus third country participant optional)

All third countries

2. **Specific co-operation actions** dedicated to International Cooperation Partner Countries (ICPC) based on mutual interest in particular topics.

Developing and emerging countries

International Cooperation in FP7 -
FUNDING Modalities (DRAFT

An FP7 financial contribution may be granted to:

any legal entity established in a third country other than an International Cooperation Partner Country (ICPC), provided that at least one of the following conditions is met:

- *if provision is made for this purpose in the specific programmes or in the relevant work programme*

or

- *if the third country participant is essential for carrying out the project*

or

- *if such funding is foreseen in a bilateral science and technology agreement, or other arrangement between the EU and the country in which the legal entity is established, that opens the research funding schemes of the EU to such a legal entity.*